



Homework 1 Compression and encryption

Files are compressed using a variety of techniques. An image file is compressed differently than a folder containing text files.

1. Compression reduces the size of a file by removing unnecessary data.

a) Explain the difference between lossy and lossless compression: [3]

b) Explain why Run-Length Encoding works well to compress a sound file without losing any of the original data: [3]

c) Sound files can also be encoded using lossy compression techniques. Describe why these techniques reduce files more significantly than RLE but can have a detrimental effect on the quality of the file: [3]

2. Encryption is used to obscure data from being understood without authorisation.

Files can be encrypted using various methods.
Two methods of encryption are the Caesar or Vernam cipher.

a) Explain why the Caesar cipher can be easily cracked. [1]



- b) The Vernam cipher is proven to be unbreakable. Explain why. [2]
3. a) Explain the difference between symmetric and asymmetric encryption. [2]
- b) Explain briefly how asymmetric encryption is used. [2]
4. a) Explain what is meant by **hashing**. [1]
- b) Explain why passwords and PINs may be hashed, and how a user's password can then be verified. [3]



[Total 20 Marks]